South CENERAL REGION

File
Jackpile - Paguate
Laguna Pueblo
NW-17136

Report of Examination
The Anaconda Company
Bluewater Mill
Valencia County, New Mexico
February 29, 1980

October 17, 1979, David Sitzler and I visited the captioned uranium milling facility in the company of Mr. Craig Olsen, Chief Metallurgist. The purpose of the visit was the examination of the procedures used to weigh, sample and assay the ore delivered to the mill from the Jackpile-Paguate Mine on the Laguna Indian Reservation. The tonnages and grades determined at the mill are used to calculate the royalties due the Pueblo of Laguna. The mill was visited for the same purpose April 15, 1977, but the mill has been expanded and modified since that time.

Anaconda conducts both open-pit and underground mining at the Jackpile-Paguate Mine. The ore from these operations is placed in mine stockpiles according to grade (% U_3O_8) as determined by scanners (scintillometers) at the mine. The ore is subsequently transferred from these mine stockpiles into railroad cars or highway haulage trucks for shipment to the Bluewater Mill.

The railroad cars are loaded with ore at the mine railhead. Ore is transferred from the mine stockpiles to the railhead crusher according to grade, and the crusher undersize is loaded into the 100-ton railcars by a conveyor belt equipped with a weightometer and scanner. The weight and grade of ore loaded into each car is recorded, and loading is conducted so that the entire trainload of ore averages 0.05 to 0.10% U_3O_8. The trains are transported to the mill by the Atchison, Topeka and Santa Fe (ATSF) Railroad.

The highway haulage trucks are loaded from one particular mine stockpile at a time with no attempt to blend the ore to a specific grade. Each truck is weighed (gross weight only) and scanned before leaving the mine property to determine the weight and grade of ore contained.

The mine and railhead scanners and railhead belt weightometer are all checked and calibrated by Anaconda. Eberline Instrument Corp. repairs all of the scanners as necessary. The mine truck scales are checked and certified at irregular intervals by the New Mexico State Department of Agriculture. The Morse-Fairbanks Division of Colt Industries, manufacturers of the truck scales, performs any required maintenance.

Upon arrival at the mill, each loaded railcar is weighed on track scales at the mill ore trestle, and the wet weight of the ore contained is determined by deducting a standard car weight from the total weight. Each car is then dumped into one of four bays under the ore trestle, and the scale weight and bay location of each car are recorded. The contents of one or more ore bays are designated as mill lots (1000 to 3000 tons each), and these lots are the primary source of mill feed material.

Each highway haulage truck is weighed both loaded and empty on truck scales at the mill to determine the wet weight of ore contained. The contents of each truck are then designated as a mill lot and fed directly into the milling circuit or are dumped into one of three mill stockpiles that provide a secondary source of mill feed material. Stockpile 96 (SP-96) receives most of the truck ore and provides mill feed on a regular basis while the other two stockpiles are for emergency situations.

The mill track and truck scales are checked and certified at irregular intervals by the New Mexico State Department of Agriculture. The track scales are also checked every 3 months by the ATSF Scale Department who reports its findings to the New Mexico State Corporation Commission and to the Trans-Continental Freight Bureau, South Pacific Coast Territory. The Morse-Fairbanks Division of Colt Industries, manufacturers of both the track and truck scales, performs any required maintenance.

The moisture content of all ore is determined at the mill laboratory by Anaconda chemists using standard analytical techniques. Generally, ore loading results in three "peaks" in each railroad car or haulage truck. Upon arrival at the mill, a grab sample is taken from inside each "peak" (i.e., from three difference locations in each car or truck), and the three grab samples are combined to form a composite sample for each railcar or truck. Each composite sample is weighed, heated to drive off the contained moisture, and then weighed again. The wet and dry weights so obtained determine the moisture content (% H_2O) of each sample and hence the dry weight of ore contained in each railcar or truck.

Assay samples are taken from all ore lots entering the mill. Prior to expansion and modification of the mill, the mill feed was sized by a jaw crusher and impact breaker, and an automatic, continuous sampling plant would then cut a dry assay sample of about 2 pounds of ore per ton of mill feed. This circuit has been replaced by a semi-autogenous, wet grinding mill in closed circuit with two cyclones. The cyclone discharge is mill feed pulp and passes through an automatic, continuous sampler before entering the mill leach circuit. The sampler takes a double cut of feed pulp every 3 minutes resulting in 4 to 5 gallons of pulp sample from each ore lot. Each pulp sample is then dried and cut to obtain a dry assay sample of 150 to 200 grams for the assay laboratory. Basically, the only real difference between

the old and new sampling procedures is that pulp (wet) samples instead of dry samples are now cut from the mill feed.

In the mill laboratory, each assay sample is analyzed twice for uranium content by Anaconda chemists using standard analytical techniques. The average of these two assays is the uranium content (% U_3O_8) of each lot for royalty calculation purposes. If the first two assays do not agree within 0.002% U_3O_8, two more analyses are conducted, and the two closest assays of the four are averaged for the uranium content of each lot. Each week, three random check samples are sent to an independent laboratory in Grants, New Mexico, for analysis, and the independent assays are compared to those obtained by the Anaconda chemists. Any significant differences between the Anaconda and independent assays would be resolved by re-analyzing the samples in question. Also, the USGS can request, under the provisions of 30 CFR 231.20, a cut of each assay sample for analysis by an independent laboratory.

Verification of the mill feed weights and assays is also provided by Anaconda's accounting and metallurgical balances of the milling process. Accounting balances involve equalizing the total pounds of uranium in and out of the mill while metallurgical balances involve equalizing the total amount of material in and out of the mill. The uranium concentrate recovered (yellow cake) and the solid and liquid tails discharged (wastes) are also weighed, sampled and assayed to provide the product quantities necessary for these balances.

Anaconda's weighing, sampling and assaying procedures are undoubtedly similar, if not virtually identical, to those used at other uranium mills in the United States. Furthermore, the procedures seem to have sufficient audit capabilities to prevent or discover any errors, whether accidental or intentional. The attached verification summary outlines the internal checks applicable to the ore weights and

assays. In the past, Anaconda had certain amounts of ore from the Jackpile-Paguate Mine custom milled at Kerr-McGee Corporation's mill in Ambrosia Lake and at Sohio's mill near Marquez. Personnel from this office will visit these facilities in the near future to examine the weighing, sampling and assaying procedures used there although Anaconda now has ore custom milled only at Sohio's mill.

Accurate calculation of royalties due the Pueblo of Laguna depends not only on obtaining correct ore weights and assays but also on the correct application of those data as the ore is milled. This inspection and a review of recently submitted royalty statements indicate that there may be some confusion in Anaconda's application of such data in regards to the ore transported to the mill by haulage trucks. This matter is still under investigation, but a brief description of the situation follows.

The dry weight of the ore contained in each railroad car is accurately determined by the mill track scales and moisture analyses, and that weight and its bay location under the ore trestle are recorded. The contents of one or more bays constitute a mill lot, and an accurate dry weight of such a lot is therefore readily available. As each lot is fed into the mill, a sample is taken, and the uranium content of the lot is accurately determined by assaying the sample. Since the railcar ore is the primary source of mill feed, it is processed as soon as it is delivered to the mill, and the accurate dry weights and assays can be applied directly to the royalty calculations on a monthly basis.

The ore transported to the mill by haulage trucks is a secondary source of mill feed and, as such, is handled in one of the two ways. Upon delivery to the mill, one or more truckloads may be designated as a mill lot and fed directly into the mill. The dry weight of each such lot is accurately determined by the mill truck scales and moisture

analyses, and the uranium content of each lot is accurately determined by assaying the lot sample taken as the ore is fed into the mill. Since the ore is processed immediately, the accurate dry weights and assays can be applied to the royalty calculations on a monthly basis.

If the truck ore is not fed into the mill upon delivery, it is placed in one of the three mill stockpiles. The accurate wet weight and moisture content of the ore in each truck are determined by the mill truck scales and moisture analyses, and the grade of each truckload of ore is estimated by the mine scanner records. Using these data, Anaconda maintains a running stockpile inventory (total wet tons, total dry tons, total pounds of uranium, weighted average moisture content, and weighted average grade). This inventory is adjusted as ore is added to the stockpile, but only the weights and moisture content are accurate. The uranium content of the stockpile is estimated from the mine scanner records.

As mill feed is needed, ore is transferred from a stockpile to the mill in lots of varying weights. The weights of these lots are estimated by a weightometer on the conveyor belt feeding the mill grinding circuit and the weighted average moisture content of the running stockpile inventory. The uranium content of the mill lots are also estimated from the weighted average grade of the running stockpile inventory. The running stockpile inventory is continuously adjusted according to the estimated lot data as the lots are fed into the mill. The actual uranium content of the lots are determined by assays samples and, as the assays are obtained, the running stockpile inventory is again adjusted to correct for the difference between the estimated and actual uranium content of each lot. This adjustment is made to the running stockpile inventory in pounds of uranium only.

In regards to royalties, the confusion with the stockpile accounting procedures described above appears to be that accurate weights and assays cannot be applied to the royalty calculations on a monthly basis. Estimated weights and accurate assays result in estimated royalties because the royalty calculations involve the total dry tons produced monthly and the value per dry ton as determined by the weighted average grade of the ore produced. Adjustment of the estimated royalties according to actual weights and assays can be accomplished only when the stockpile inventory is completely depleted, and it is not known if such a final adjustment would be compatible with the royalty schedule. This matter will be resolved as soon as possible.

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Original to: Superintendent, Southern Pueblos Agency, BIA
cc: Governor, Pueblo of Laguna
Acting Conservation Manager, Central Region, USGS
Files (Laguna 1 and 4, Production)